



ORIGINAL EX PARTE OR LATE FILED
MULTISPECTRAL SOLUTIONS, INC. INDICATE FILED
A Tradition of Excellence in Innovation

25 July 2001

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

RECEIVED

AUG 07 2001

FCC MAIL ROOM

Re: *Ex Parte* Presentation, ET Docket 98-153

Dear Ms. Salas:

On 25 July 2001, the undersigned and Mr. Robert Mulloy, MSSI Vice President, met with Ms. Lauren Van Wazer of Commissioner Michael J. Copps office to discuss regulatory issues relating to ultra wideband (UWB) technology.

We emphasized that, while a modification to Part 15 could certainly benefit UWB technology, the unprecedented access to §15.209 restricted bands must take into account the potential impact to other services, particularly those pertaining to safety-of-flight and safety-of-life. Based upon current test results, we recommended that the FCC take a two step approach toward the introduction of UWB technology:

Step 1: Open up 3.1 to 12.0 GHz (alternatively, 5.46 to 12.0 GHz) for unlicensed UWB operation;

Step 2: Evaluate commercial UWB products created under Step 1, and only consider operations below 3.1 GHz (alternatively, 5.46 GHz) and above 12 GHz when significant, real-world data is made available for public comment.

In accordance with the Commission's rules, an original and one copy of this letter, together with viewgraph presentation material, are being filed. An electronic copy has also been uploaded to the FCC Electronic Filing system.

Respectfully,

Robert J. Fontana, Ph.D.
President

No. of Copies rec'd 071
LEABODE

cc w/attachment: Mr. Julius Knapp

Ultra Wideband Technology Regulatory Issues

Presented to
Commissioner Michael J. Copps
Ms. Lauren Van Wazer

by
Multispectral Solutions, Inc.

25 July 2001

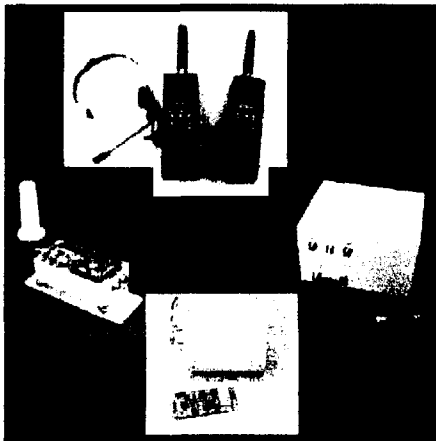


MULTISPECTRAL SOLUTIONS, INC.

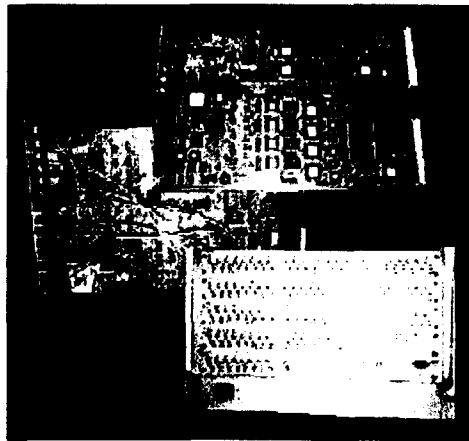
A Tradition of Excellence in Innovation

Multispectral Solutions, Inc.

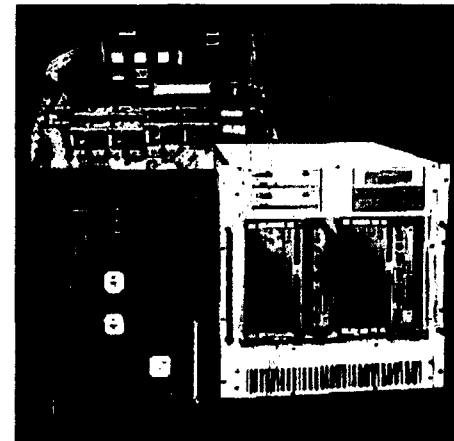
- Small Business Incorporated in 1989
 - Dr. Robert Fontana (Ph.D. Stanford, S.M. MIT) founder
- Industry Leader in UWB Technology
 - MSSSI Principles involved in UWB since 1984
 - 50 new UWB program awards in 11 years
 - 44 UWB awards within last 6 years



Ultra Wideband Systems



Satellite Systems



High-Speed Parallel Systems



MULTISPECTRAL SOLUTIONS, INC.

A Tradition of Excellence in Innovation

UWB has emerged after nearly 40 years of development

2000	2001 MSSI captures 44th UWB contract award since 1994
	1994 MSSI's first UNCLASSIFIED UWB communications programs
1990	1990 OSD/DARPA "Assessment of Ultra-Wideband (UWB) Technology"
	1986 First fielded "short pulse" UWB Communications system (Ross/Fontana)
1980	1978 Ross et al. – First demonstrated (free space) UWB communications system
	1978 Bennett & Ross – "Time-Domain Electromagnetics and Its Applications" – Seminal paper
	1978 Morey – Fundamental patent on UWB GPR U.S. Patent No. 3,806,795 (April 1973)
	1973 Ross – Fundamental patent on UWB communications U.S. Patent No. 3,728,632 (April 1973)
1970	1972 Robbins – Fundamental patent on single-pulse, quantum tunneling detector
	1965 G. Ross – Sperry Research development of UWB technology (1965-1980)
	1963 G. Ross – Ph.D. thesis (with A. Papoulis) on time-domain electromagnetics
1960	Late 1950's Need for impulse response analysis of microwave N-ports (Lincoln Lab, Sperry, others)

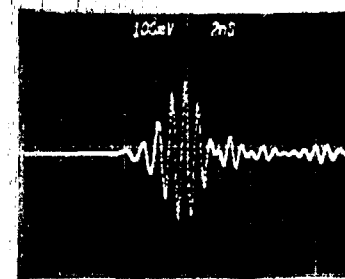


MULTISPECTRAL SOLUTIONS, INC.

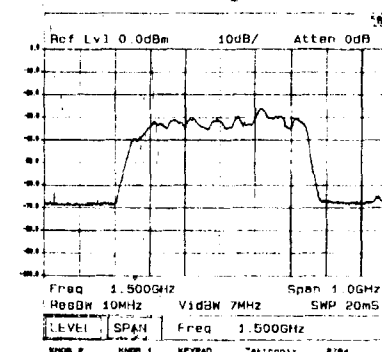
A Tradition of Excellence in Innovation

What is Ultra Wideband?

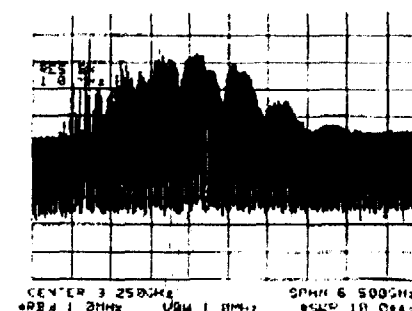
- *Short pulse waveforms*
 - “Carrier-free”, “baseband”, “impulse”
 - A few cycles of an RF carrier
- *Very large fractional bandwidths*
 - Bandwidth inversely proportional to pulse duration
 - Typically > 25%
 - Low duty cycles resulting in low average energy densities
- *Typically produced by “impulse- or step-excited” antennas, filters, etc.*
 - Not all UWB created equal
 - Spectrally filtered
 - Spectrally unfiltered



Time response



Spectrally filtered



Spectrally unfiltered

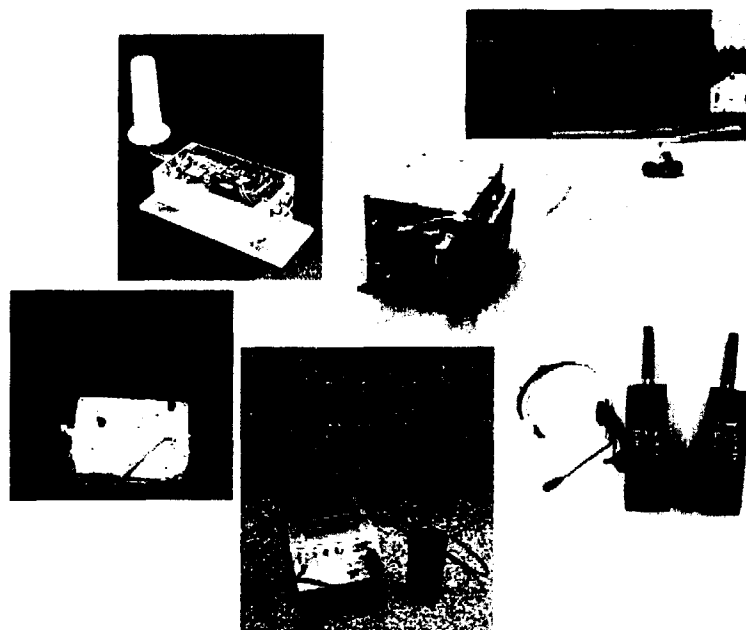


MULTISPECTRAL SOLUTIONS, INC.

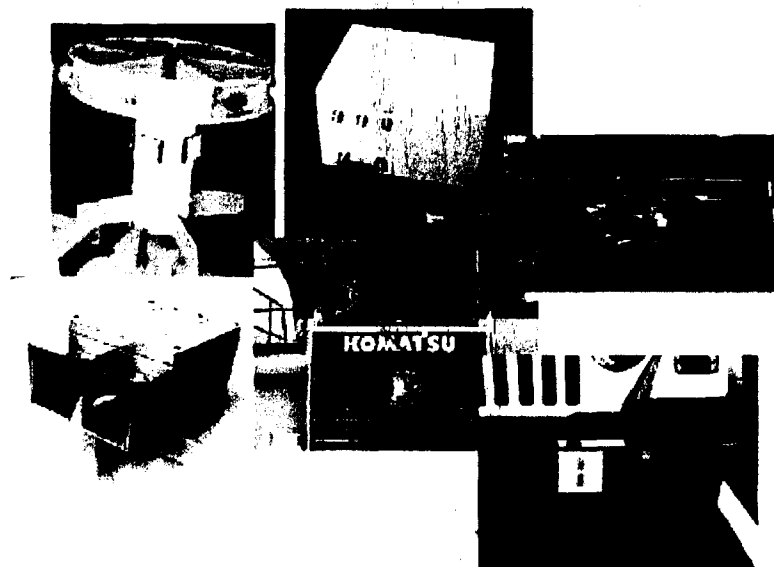
A Tradition of Excellence in Innovation

Recent MSSSI Ultra Wideband Systems

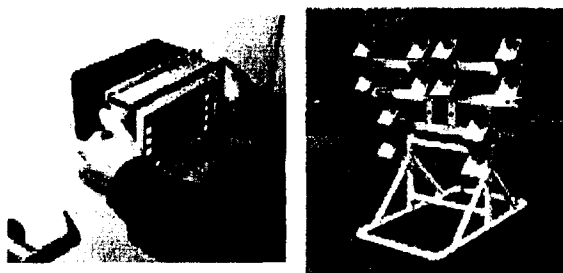
High-Speed Communications Systems



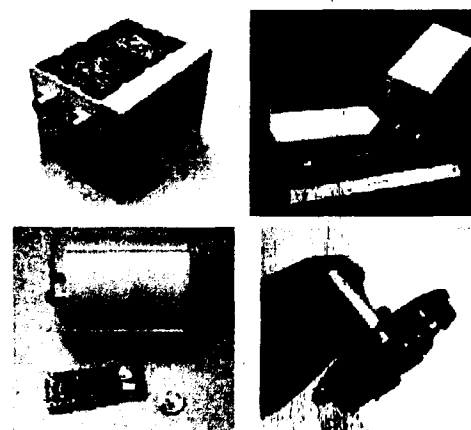
Precision Altimetry & Collision Avoidance Sensors



Intrusion Detection Systems



Precision Geolocation & Tagging Systems



MULTISPECTRAL SOLUTIONS, INC.

A Tradition of Excellence in Innovation

MSSI FCC 072501 - 5

UWB Products & Opportunities

Military/Government

- Tactical Handheld & Network LPI/D Radios
- Precision Geolocation Systems
- Non-LOS LPI/D Groundwave Communications
- LPI/D Wireless Intercom Systems
- LPI/D Altimeter/Obstacle Avoidance Radar Tags
- Intrusion Detection Radars
- UAV/UGV Datalinks
- Proximity Fuzes

Commercial

- High Speed LANs/WANs
- Precision Geolocation Systems
- Tags (Intelligent Transportation Systems, Electronic Signs, Smart Appliances)
- Collision Avoidance Sensors
- Intrusion Detection Radars
- Altimeter/Obstacle Avoidance Radars (commercial aviation)
- Industrial RF Monitoring Systems



MULTISPECTRAL SOLUTIONS, INC.

A Tradition of Excellence in Innovation

UWB Commercialization

■ Regulatory Issues

- ET 98-153 Ultra-Wideband Transmission Systems
 - Notice of Inquiry issued September 1998
 - Notice for Proposed Rule Making issued May 2000
 - Rule making anticipated 4th Quarter 2001
- Issues
 - UWB proponents desire operation across §15.209 restricted bands
 - Interference demonstrated below 3.1 GHz
 - NTIA, Stanford University, Sprint, Time Domain, University of Texas - Arlington tests show potential interference to Government radars and GPS
 - Interference effects aggravated by high PRF and multiple transmitters

■ Recommendations

- NTIA – operation below 3.1 GHz is “problematic” except for lower (<20 Mpps) PRF applications
- ATA *et al.* (30 companies) – stay above 5.46 GHz safety-of-life band (recommended operation in 6.0 - 12.0 GHz, with 500 MHz “guard band”)
- MSSI
 - stay above 3.1 GHz with limit on PRF at 20 Mpps
 - alternatively, permit operation in the 5.46 to 12.0 GHz band with no PRF limits
 - enables benefits of UWB technology for all potential applications, including high speed wireless LANs



MULTISPECTRAL SOLUTIONS, INC.

A Tradition of Excellence in Innovation

Summary & Conclusions

- UWB is poised to enter commercial marketplace
 - 40 year history of technology development, with rapid growth in last 5 years
 - UWB technology has demonstrated great potential for high speed communications, radar, and geopositioning applications
- Modification to FCC Part 15 is necessary for widespread UWB commercialization
 - FCC approval will allow UWB to address multiple, high-growth, commercial markets
- Unprecedented access to §15.209 restricted bands must be permitted *only* after careful consideration for all affected parties, and with particular attention to safety-of-flight and safety-of-life allocations
 - As with existing spread spectrum regulations, UWB can be approved in steps
 - Step 1: Open up 3.1 - 12.0 GHz (or, alternatively, 5.46 - 12.0 GHz) for unlicensed UWB operations
 - Step 2: Evaluate commercial UWB products, and only consider operations below 3.1 GHz when significant, real-world data is made available for comment (future modifications to Part 15)



MULTISPECTRAL SOLUTIONS, INC.

A Tradition of Excellence in Innovation